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ABSTRACT

Why do some adolescents cheat and others do not? To answer this question, the relationship between motivational factors and self-reported cheating beliefs and behaviors was examined in a sample of early adolescents. It was hypothesized that cheating and beliefs in the acceptability of cheating would be more likely to occur when students perceived an emphasis on performance and ability, rather than on mastery and improvement. Questionnaires were administered to 285 students in an urban middle school in a southeastern state. Analysis of their answers indicate that students who reported cheating in science perceive their classrooms as being extrinsically focused (e.g., maintaining grades, getting the right answer, avoiding trouble) and perceive their school as being focused on performance and ability. Students who believe in the acceptability of cheating also report personal extrinsic goals. Likewise, students who cheat worry about school, although worry was unrelated to beliefs about the acceptability of cheating. A relationship between cheating and self-handicapping was also evident, with students who engage in self-handicapping behaviors being likely to report that they cheat. Demographic factors were unrelated to cheating and no sex differences were found. The hypothesis was largely proven correct. Contains approximately 80 references. (AUTH)

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Motivation and Cheating During Early Adolescence

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The University of Kentucky

Running head: Motivation and Cheating

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Abstract

The relationships of motivational variables to self-reported cheating behaviors and beliefs about the acceptability of cheating in science were examined for a sample of early adolescents. It was hypothesized that cheating and beliefs in the acceptability of cheating in science would be more likely to occur when students perceived an emphasis on performance and ability, rather than on mastery and improvement. Results of logistic regression analyses indicated that students who reported cheating in science perceived their classrooms as being extrinsically focused, and perceived their schools as being focused on performance and ability. Students who reported believing in the acceptability of cheating also reported personal extrinsic goals, and a perceived emphasis on extrinsic factors in science classes. Students who reported cheating also reported worrying about school, although worrying was unrelated to beliefs about the acceptability of cheating. The reported use of deep cognitive strategies in science was negatively related to cheating beliefs and behaviors.

Motivation and Cheating During Early Adolescence

Why do some adolescents engage in cheating behaviors, while others do not? What are the motivational factors related to cheating during adolescence? The present study examines relations between motivational factors and self-reported cheating beliefs and behaviors in a sample of early adolescents.

The Link Between Cheating and Motivation During Adolescence

The practice of cheating in schools has increased over the past thirty years (Schab, 1991). Nevertheless, explanations for why students cheat on exams and assignments remain elusive. Some students may feel compelled to cheat in order to earn grades; others may cheat so that they will earn grades that will enable them to participate in athletics; others may cheat in order to please their parents; still others may cheat because they find the subject matter to be uninteresting.

One area of research that has received relatively little attention is the possible link between motivational variables and cheating. Students' beliefs about why they do their school work, as well as environmental variables that shape these beliefs, may be related to engagement in cheating behaviors. Researchers operationalize motivational variables in a variety of ways (see Pintrich & Schunk, 1996, for a review). Motivational variables from a variety of theoretical frameworks have been linked with negative academic outcomes. For example, it has been demonstrated that the use of extrinsic incentives can undermine intrinsic motivation in learners (e.g., Lepper, Greene, & Nisbett,

1973). In addition, it has been demonstrated that that students who are hig
ly performance oriented tend to choose simple academic tasks, and often are
ot as willing to take academic risks as much as less performance oriented chil
en (Ames, 1992).

Some theoreticians argue that negative outcomes such as lowered intrinsic motivation and an unwillingness to take on challenging tasks are a r
sult of an emphasis on grades, performance, and relative ability, as opposed to
n emphasis on intrinsic reasons for learning and task mastery (e.g., Ames, 19
2; Dweck & Leggett, 1988; Lepper & Hodell, 1989). There are reasons to susp
ect that a similar relationship exists between these motivational variables and cheating. If a student sees the goal of an academic task as either (a) gettin
a good grade, or (b) demonstrating one's competence, then the student may s
e cheating as a means to achieving the goal. When the goal of an academic t
sk involves mastering the task and truly learning the material for intrinsic reaso
s, then cheating may not be a viable means to achieving a goal of task master
in contrast, when the primary goal is to earn a good grade or to demonstrate al
lity, some students may perceive cheating as a logical and justifiable strategy for achieving that goal.

The motivational climate associated with middle level schools may be particularly conducive to increased cheating behaviors. Indeed, the transitio
from elementary to middle level schools has been associated with decremen
s in academic achievement and motivation (Eccles & Midgley, 1989; Harter, Whitesell, & Kowalski, 1992; Simmons & Blyth, 1987). Research has

demonstrated that middle school teachers and students are more focused on grades and performance, and less focused on task mastery and intrinsic reasons for learning, than are elementary school students and teachers (e.g., Anderman & Midgley, in press; Midgley, Anderman, & Hicks, 1995). Research also indicates that in many middle level schools, the academic tasks are less demanding, there are less opportunities to make choices, and students have poorer relationships with their teachers, compared with elementary schools (Eccles & Midgley, 1989). Consequently, a middle school environment that stresses grades and performance, and does not provide students with interesting academic tasks, may prove to be fertile ground for cheating.

Prior Research on Cheating

While there has been a great deal of research on cheating, most studies have focused on college populations, and most studies have focused on descriptions of the characteristics of students who are likely to engage in cheating behaviors. For example, in a recent study, Newstead, Franklyn-Stokes, and Armstead (1996) reported that among college students, men reported cheating more than did women, younger students reported cheating more than did older students, and lower ability students reported cheating more than did higher ability students.

Cheating in science. Given recent reform efforts emphasizing the need to improve science education (e.g., National Research Council [NRC], 1996), as well as research demonstrating the need to improve science education specifically for women (e.g., Eccles, 1986), a strong emphasis is being placed on

the improvement of science education in today's schools. This increased pressure to improve science learning and performance may cause students to be particularly vulnerable to cheating in science. In particular, when schools are held accountable for student performance, the pressures placed on both teachers and students may lead to cheating in order to meet standards, receive incentives, or avoid sanctions (cf., Winograd, Anderman, & Bliss, 1996). Indeed, some research has documented that cheating is more typical in science than in other academic domains, although most of these studies have focused on college student populations. For example, Newstead and colleagues (Newstead et al., 1996) found that cheating was more typical in science and technology courses than in other subject areas. A study of cheating in college science classes (Lord & Chiodo, 1995) indicated that 83% of 300 respondents reported having cheated at science at sometime in their lives. Bowers (1964) found higher levels of cheating among engineering and business students than among students in other academic disciplines. In a study using adolescents, Schab (1991) found that cheating was most typical in science and mathematics. These results were evident on surveys administered at three distinct points in time covering a 20 year period.

Distinguishing between cheating behaviors and beliefs about cheating. Some studies specifically have addressed cheating behaviors in students, while others have focused on the beliefs that students and teachers maintain about cheating. Studies concerning beliefs about cheating have addressed a broad array of topics, including beliefs about the circumstances that lead to cheating,

beliefs about justifications and rationalizations for cheating, beliefs about how often cheating occurs, and beliefs about what constitutes cheating (e.g., Evans & Craig, 1990; Genereux & McLeod, 1995; McLauglin & Ross, 1989; Schab, 1991). Studies of students' beliefs about cheating indicate that students often believe that cheating is related to characteristics of the instructor or of the assessments used in courses (Genereux & McLeod, 1995), and that cheating often is a direct result of fear of failure (Schab, 1991). Some studies comparing teachers', administrators', and students' beliefs about teaching indicate that teachers and students maintain different types of beliefs about cheating. For example, Evans and Craig (1990) found that students are more likely to believe that teacher and classroom characteristics are conducive to cheating than are teachers. McLaughlin and Ross (1989) found that faculty-administrators believed that actions such as giving answers on exams, copying on exams, and getting answers from others were more serious than did students.

Studies of cheating behaviors generally have used various types of self-reports of cheating. Some studies directly have asked students about their cheating behaviors. For example, Schab (1991) asked students, "Have you used a cheat sheet on a test?" Students responded either "Yes" or "No." The proportion of students that responded positively to this statement dramatically increased over time: 33.8% indicated having cheated in a 1969 sample, 59.5% in a 1979 sample, and 67.8% in a 1989 sample. Other studies have asked students how likely they would be to engage in certain types of cheating behaviors if given the opportunity. Such studies assess students' beliefs about

their own like
lihood to cheat, as opposed to directly asking students to report if the ever had
cheated. For example, Calabrese and Cochran (1990) asked students to i
dicate on a Likert-type scale the frequency with which they believed they
would partake in 18 different types of cheating behaviors.

Cheating Du
ing Adolescence.

Comp
aratively few studies specifically have examined cheating behaviors during adole
cence. Nevertheless, there is reason to believe that cheating is very commo
during adolescence. In their large-scale studies of adolescent development
Steinberg and his colleagues report that two-thirds of the students in their samp
e indicated that they had cheated on a test in school during the past school y
ear. In addition, nearly nine out of ten participants admitted that they had cop
ed someone else's homework during the past year (Steinberg, 1996).

In the
studies of cheating that have been done, a variety of different aspects of ch
eating have been explored. For example, in one study, Calabrese and Cochran
(1990) compared cheating among adolescents in public and private high schools.
They found that cheating was most prevalent among white males attending priv
ate schools. However, they also reported that students who reported feeli
ng alienated from school (e.g., disliking school, perceiving school and teachers
as unfair) were highly likely to cheat. In addition, they reported that females and
Asian students were less likely to cheat than others; however, females and
Asian students were more likely to cheat if they also were helping other student
s.

In a large-scale study comparing teacher and student perceptions of cheating in a sample of adolescents, Evans and Craig (1990) found that both teachers and students reported that cheating is a serious problem. However, teachers and students reported differing beliefs about various aspects of cheating. For example, teachers were more likely than students to feel that cheating included both giving and receiving advanced information about tests. Teachers also reported more than did students that missing exams without a justifiable excuse is a form of academic duplicity. They found no discernible pattern of differences in beliefs about cheating between high school and middle school students.

In a cross cultural study comparing cheating behaviors in adolescents from the US, Costa Rica, and Germany, Evans and colleagues (Evans, Craig, & Mietzel, 1991) found that German students reported less cheating than did American and Costa Rican students. Evans and colleagues examine this finding in terms of differences between the American, Costa Rican, and German educational systems. Specifically, they suggest that the German educational system, which is more formally structured than the American or Costa Rican systems, and which relies more heavily on placing students in different tracks depending on ability and motivational levels, may lead German students to interpret cheating behaviors differently than do American or Costa Rican students. Evans et al. (1991) suggest that German adolescents simply may see cheating as less serious because it may occur less often in Germany than in other cultures. In addition, cheating may have a different cultural interpretation

for German students. As evidence of this, they report data indicating that both (a) plagiarism, and (b) taking advantage of teachers' errors in marking papers, were not seen as serious rule violations to German students (see Evans et al., 1991).

Schab (1991) examined changes in cheating patterns of adolescents over time. A survey examining various beliefs and practices about cheating was given to samples of over 1000 high school students in 1969, 1979, and 1989. In general, beliefs about the prevalence of cheating, as well as admissions of cheating, increased during this period. In addition, over time, adolescents reports of feeling that being dishonest is necessary increased over these two decades.

Cheating and Goal Orientation Theory

It has been further suggested that cheating behaviors may be associated with certain motivational orientations (e.g., Newstead et al., 1996). Goal orientation theorists contend that students adopt goal orientations based on the practices of the classroom and the school (Ames & Archer, 1988; Maehr & Midgley, 1991). Mastery goals (also referred to as learning or task-involvement) are associated with learning for its own sake, or truly mastering the task at hand. Performance goals (also referred to as ability goals, or ego-involvement) are associated with demonstrating one's ability. Individuals who are performance oriented often are interested in appearing competent, and in their relative standing compared to others (Ames & Archer, 1988; Dweck & Leggett, 1988; Maehr & Midgley, 1991; Nicholls, 1984). Some researchers draw a further

distinction between performance goals and extrinsic goals (e.g., Pintrich & Garcia, 1991; Young & Urdan, 1993). An extrinsic goal orientation is associated with engaging in a task in order to earn some type of extrinsic incentive, such as a grade or a reward, whereas a performance goal is associated with demonstrating one's ability (see Pintrich & Schunk, 1996, for a review).

More specifically, it is possible that extrinsic and performance focused environments may be more conducive to engagement in cheating behaviors than mastery oriented environments, at least among college students. For example, Newstead et al. (1996) suggested that students with learning goals would be less likely to engage in cheating behaviors than students with performance goals. They found that men reported that they cheated to increase their grades more than did women; they also found that younger college students were more likely to report cheating for extrinsic reasons than were older students. College students in this study also reported time pressures as a major reason for cheating.

Organizational levels of achievement goals. Researchers using a goal-orientation perspective often distinguish between three different organizational levels of motivation -- personal, classroom, and school-wide goal orientations. These differing organizational levels of motivation may have unique influences on the likelihood of engaging in cheating behaviors. For example, it is possible that a student who is highly mastery goal oriented on a personal level may cheat in a classroom or school environment that is perceived as stressing extrinsic

incentives and ability differences. Nevertheless, research to date specifically has not examined this question.

First, many studies include measures of students' personal or individual goals. Measures of students' personal goal orientations often assess the reasons why students do their school work. For example, Midgley and her colleagues use items such as "An important reason I do my schoolwork is because I like to learn new things" to assess the task (mastery) dimension (Midgley et al., 1997).

Second, some studies include measures of students' perceptions of the classroom goal stresses. In some classrooms, teachers use instructional practices that emphasize extrinsic incentives and ability differences, whereas other instructional practices emphasize task mastery, improvement, and effort. Ames and Archer (1988) found a positive relation between perceptions of task goal stresses in the classroom and positive attitudes toward learning. They also found a positive relation between the use of effective learning strategies and perceptions of task goal stresses. Anderman and Midgley (in press) used items such as "Our teacher makes sure that everyone gets to participate in math class" to assess students' perceptions of a stress on task (mastery) goals in middle school math classrooms.

Third, some studies focus on the motivational climate of the school as a whole. Midgley and her colleagues (Midgley et al., 1995) demonstrated that middle level schools tend to be more focused on grades, ability, and performance than are elementary schools. They asked students about their

perceptions of the culture of the school as a whole. School culture was operationalized as a culture that places an emphasis on mastery and improvement (a task or mastery culture), as compared with a culture that stresses relative ability, grades, and performance (an ability or performance culture). Midgley and colleagues used items such as, "In this school any student can be successful" to assess perceptions of a school-wide emphasis on task (mastery) goals (Midgley et al., 1995). Midgley and colleagues found that middle school teachers and students perceived the school culture as more performance oriented and less task oriented than did elementary school teachers and students. Middle school teachers also reported using instructional practices emphasizing task goals less than did elementary school teachers.

There also is evidence that the culture of the school as a whole plays an increasingly important role as children move from elementary to middle level schools. In a study including over 16,000 students from 880 public schools, Maehr (1991) found that school culture variables accounted for increasing amounts of variance in student motivation as students reached higher grades. In the 4th grade, school culture variables accounted for 7% of the variance in motivation, in the 6th grade, they accounted for 11%, in the 8th grade they accounted for 14%, and in the 10th grade they accounted for 21% (Maehr, 1991). Thus as students move to higher grade levels, perceptions of the overall school culture become more strongly related to motivational factors. Consequently, the increasing emphasis on ability and performance associated with middle schools (Midgley et al., 1995), along with the increasing impact that

perceptions of the school culture have on motivation (Maehr, 1991), may lead some middle grades students to resort to cheating as a means of coping with an environment that is perceived to stress ability and performance.

Motivation and strategy usage. Research suggests that cognitive and self-regulatory strategies may be related to goal orientations. Students with learning goals tend to persist at academic tasks longer, and may not be as compelled to look for academic short-cuts as students with performance goals (see Pintrich & Schunk, 1996, for a review). The reported use of deep-level cognitive processing strategies (e.g., trying to figure out why one has made a mistake; trying different ways to solve problems) has been associated with perceptions of a mastery goal orientation in a variety of studies (e.g., Ames & Archer, 1988; Nolen, 1988; Nolen & Haladyna, 1990; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991).

Results of these studies specifically indicate that individuals who are mastery (task) oriented may use more elaborate and demanding cognitive strategies than students who are ego (ability) oriented. The use of such cognitive strategies involves a certain amount of volition and effort (Paris & Cross, 1983). Thus students who use complex cognitive strategies often believe that such strategies are useful, important, and related to academic success (McCombs & Marzano, 1990; Paris & Cross, 1983). Although previous studies have not linked the use of such strategies to cheating, there is reason to suspect that students who use such strategies may be less likely to cheat. Since students who use deep cognitive strategies often make a deliberate, conscious

choice to use
hese strategies, engagement in cheating might defeat the use of the appropri
e strategy. If a student is going to expend the effort needed to identify and u
e the appropriate strategy, it may be of little value to the student to cheat, since
heating might undermine the effort expended to use the strategy.

Self-h
ndicapping and cheating. Although most of the research on self-handicapping
has occurred outside of the academic domain (e.g., Berglas & Jones, 1978)
some recent research suggests that students do utilize self-handicapping
strategies in school settings. Academic self-handicapping strategies ar
used when students actively shape the circumstances surrounding academic su
cess and failure, so that academic failure can be attributed to those circumstance
, rather than to ability (Garcia & Pintrich, 1993). Midgley and Urdan (1995)
suggest that "it can be expected that students who perceive the learning envi
onment to be performance focused and who are oriented to extrinsic or r
lative ability goals would use self-handicapping strategies more than would s
udents who perceive the learning environment to be task focused and who are
riented to personal task goals" (Midgley & Urdan, 1995, p. 392).

Midgl
y and colleagues have operationalized self-handicapping strategies in terms of h
w much students agree with statements such as, "Some students purposely do
't try hard in school so that if they don't do well, they can say it's because the
didn't try hard. How true is this of you?" (Midgley, Arunkumar, & Urdan, 1996
Midgley & Urdan, 1995). Using a sample of early adolescents, Midgley and
Urdan (1995) found that boys used self-handicapping strategies more than di
l girls, and that low achievers used such strategies more than did

high achievers. They also found that the use of self-handicapping strategies was related to extrinsic achievement goals. Other studies (e.g., Garcia & Pintrich, 1993) also found that male students reported using self-handicapping strategies more than did females.

While research to date has not linked self-handicapping strategies to actual cheating behaviors, there is reason to believe that students who engage in such strategies also may be likely to cheat on their school work. Midgley et al. (1996) found that the use of self-handicapping strategies is associated strongly with ego-oriented goals (i.e., wanting to do better than others, or to show how smart one is). Thus when students are focused on demonstrating their ability and avoiding failure, they are more likely to utilize such strategies. In large-scale studies of cheating among high school students conducted in 1968, 1979, and 1989, Schab (1991) found that fear of failure, which is strongly related to self-handicapping (Midgley et al., 1996), was the most consistent reason that students gave for cheating. While studies to date have not linked self-handicapping strategies and cheating, it appears that both self-handicapping and cheating are associated with a focus on grades and ability. Thus cheating may be an additional strategy that some students can rely on when there is a strong perceived stress on ability, grades, and performance.

Worrying and cheating. There is reason to suspect that students who worry about school-related issues may resort to cheating under certain circumstances. First, in general research indicates that worrying about school-related issues is common during childhood and adolescence. To examine what

children and early adolescents report worrying about, Silverman and colleagues (Silverman, La Greca, & Wasserstein, 1995) interviewed second through sixth graders. Among the many findings that they reported was the fact that school is a major cause of worry for children and early adolescents. Other studies (e.g., Amen & Reglin, 1992; Bonds & Bonds, 1990) also indicate that school is an issue that worries many children and adolescents.

Second, when students worry specifically about their academic performance, they may be compelled to cheat for a variety of reasons. Indeed, there are a number of reasons why students may worry about academics. Some students may worry about pleasing their parents, while others may worry about earning good grades for college admission or to be able to participate in athletics. There is some research that directly links worrying to cheating. For example, Schab (1991) found that the primary reason that high school students gave for cheating was fear of failure. In a study involving almost 700 adolescents in West Germany, Rost and Wild (1990) found a significant relationship between worrying about performance on tests and cheating.

The purpose of the present study is to investigate the relationships between self-reported cheating behaviors and motivational variables. It is predicted that students who report that they cheat and who endorse cheating as acceptable will report being extrinsically goal oriented toward science, will perceive their science classrooms as being extrinsically oriented, and will perceive their schools as being performance oriented (and not mastery oriented).

It also is hypothesized that cheating will be related to worrying about school a
nd to the use of self-handicapping motivational strategies.

Method

Students from an urban middle school in a southeastern state (N = 285
) completed surveys in the fall of the 1995-96 school year. The surveys were completed in one sitting. Forty-eight percent of the sample was male, and 52
% was female; 43.2% of the sample was Caucasian, 40.7% was African Americ
an, and 16.1% belonged to other ethnic groups. The sample included 141 sixth graders (49.5%), 69 seventh graders (24.2%), and 75 eighth graders (26.3%).

Measures

The questionnaire included original measures, as well as measures tha
t were adapted from Midgley et al.'s Patterns of Adaptive Learning Survey (PA
LS; Midgley et al., 1997). The full set of measures, along with Cronbach's alpha coefficients, is presented in Appendix I. The items on the original PALS were designed to assess mathematics and English. For the present study, we substituted the word "science" for "English" or "mathematics," in order to obta
in assessments of motivation in science classes. Principal components analyse
s with varimax rotations were used to examine the factor structure. Separate analyses were conducted for the individual, classroom, and school-level measures. The individual items loaded onto factors as did the original items developed by Midgley and colleagues.

The cheating scales were designed specifically for this study. For the cheating scale, students respond to items using a five-point Likert-type scale, where 1 = not at all true of me, ... and 5 = very true of me.[1] The cheating scale contained five items, and the beliefs about cheating scale contained three items (see Appendix I for items and Cronbach's alpha coefficients).

For the cheating scale, students were asked to respond to items assessing specific cheating behaviors in science: whether or not they cheat on their science work, whether or not they use cheat-sheets or copy answers on tests/assignments, and whether or not they get answers from friends when they don't understand the work. The beliefs about cheating scale asked students to assess the severity of cheating in science, as well their beliefs about whether or not they would engage in cheating in science if certain that they would not get caught. These items were then combined into the scales presented in Appendix I, based on results of the principal component analyses. Our measures are similar to the types of measures developed by Evans and Craig (1990). Evans and Craig developed four scales to measure different types of beliefs about cheating (e.g., whether or not cheating is considered to be a problem, what constitutes cheating, why cheating occurs, and how cheating can be prevented). Similar to the measures used in the present study, those measures asked students to respond to items using five point Likert-type scales. Other researchers have operationalized cheating in different ways. For example, Schab (1991) asked adolescents to respond to a long series of items about cheating behaviors and beliefs, using a Yes/No response format. McLaughlin

and Ross (1989) asked adolescents to indicate for each of 16 items whether or not the behavior constituted cheating (Yes/No), to rate the severity of the cheating behavior using a five point Likert-type scale, and to indicate how often they would engage in the behavior if they were certain that they would not get caught, using a four point Likert-type scale.

The personal goal orientation measures were developed by Midgley and her colleagues (Midgley et al., 1997). For the present study, the word "science" was substituted for the words "math" and "English." Students responded using Likert-type scales, where 1 = not at all true of me, ... and 5 = very true of me. The items and Cronbach's alpha coefficients are presented in Appendix I.

The measures of classroom goal orientation also were developed by Midgley and colleagues (Midgley et al., 1996). However, the words "math" and "English" were changed to science. These measures of classroom goal orientation are based on the work of Ames (e.g., Ames, 1992), who identified various aspects of the classroom environment that promote different types of motivation in students. The measures used in the present study focus on students' perceptions of the science teachers' behaviors and attitudes. Specifically, two measures were developed: classroom extrinsic goals, and classroom mastery goals (a performance, or ability-focused classroom goal orientation factor emerged from the factor analyses, but a reliable scale could not be developed). Our classroom extrinsic scale focuses specifically on perceptions of a classroom environment in which students are rewarded for academic performance by being able to get out of other academic tasks.

Students who perceive their science classrooms as being extrinsically focused agree with statements such as, "If we do really well, we can get out of doing some assignments or work as a reward." Our scale is quite similar to the work avoidance scale developed by Nicholls and his colleagues (Nicholls, Cobb, Wood, Yackel, & Patashnick, 1990). However, Nicholls et al.'s work avoidance scale used items such as "I don't have to work hard." Our measure of classroom extrinsic goals differs because it focuses specifically on being extrinsically rewarded by not having to do additional school work, in exchange for good performance. Students who perceive the science classroom as being mastery oriented agree with statements such as "Our teacher really wants us to enjoy learning new things." Both the personal and classroom goal orientation scales repeatedly have demonstrated reliability and validity in a number of studies (e.g., Anderman & Midgley, in press; Roeser, Midgley, & Urdan, 1996; Midgley et al., 1995). For the present study, the items forming these scales were anchored with 1 = not at all true, ... 5 = very true.

Our measures of school culture emanate from the work of Maehr and Midgley (e.g., Maehr & Midgley, 1991). Maehr and Midgley (1991) contend that school culture is a separate entity from classroom culture. In support of this argument, Maehr and Midgley have demonstrated that particularly in middle level schools, school level factors often undermine reform efforts occurring at the classroom level (Maehr & Midgley, 1996). It has been suggested that the same elements that make up classroom culture are also important parts of school culture (Maehr & Anderman, 1993). Research has distinguished school culture

from classroom culture (see Maehr & Midgley, 1996, for a review). For the present study, we developed two measures of school culture: school mastery and school ability focus (a separate factor for a school focus on extrinsic goals was not developed, based on results of factor analyses and the inability to develop a reliable measure). Students who perceive their school as stressing mastery goals agree with statements such as, "In this school, teachers believe all students can learn." Students who perceive their school as stressing performance goals agree with statements such as, "In this school, we are encouraged to compete against each other for grades." Items and Cronbach's alpha coefficients are presented in Appendix I. All items were anchored with Likert-type scales, where 1 = not at all true, and 5 = very true.

The self-handicapping scale was developed by Midgley and her colleagues, and has demonstrated excellent reliability and validity in a number of studies (e.g., Midgley & Urdan, 1995; Midgley et al., 1996). The scale consists of six items that describe various self-handicapping strategies. For each strategy, students respond to the question, "How true is this for you?" using a five point Likert-type scale, where 1 = not at all true of me, ... 5 = very true of me.

Students also indicated their grade level in school (6, 7, or 8), their ethnicity, gender, and level of parental education (1 = completed some high school, 2 = graduated from high school, 3 = completed some college, 4 = graduated from college, 5 = don't know). As an estimate of socioeconomic status (SES), the educational levels of both parents were averaged. If information was only available for one parent, then the data for that parent was used alone. This is the same measure used in Bachman et al.'s Monitoring the Future study (e.g.,

Johnston, Bachman, & O'Malley, 1992), conducted annually for the last 20 years. This measure is common in a large number of studies of adolescents for which the adolescents provide the data for just these two measures (father and mother's education). The other elements often added to measures of SES include father's and mother's occupation, and/or income. Studies in the 1970s established that youth are not familiar with these figures and cannot provide valid estimates (see Anderman & Johnston, in press, for a discussion of this issue). The one other component sometimes used is the number of books in the home (or a variant on this). This measure was not used in the present study. Since the measure used in the present study does not include information about parental occupation, income, or number of books in the home, this variable will be referred to as parental education.

Results

Cronbach's alpha reliability coefficients are presented for all scales in Appendix I. Since the dependent variables (self-reported cheating behavior and beliefs about cheating) were positively skewed (Sk = 2.5 for cheating behavior, Sk = 1.48 for cheating beliefs), we formed two groups for each variable. For the cheating behavior measure, the groups consisted of students who reported that they never cheated (61%), and students who reported that they sometimes cheated (39%). All students whose mean value on the cheating behavior scale was 1.0 were put into the never cheated category -- these represented students who reported that they never cheated -- these students responded with a value of 1 for all of the items on the Likert type scale; any participant with a mean value

greater than 1.0 on the cheating scale was put into the sometimes cheated category -- these represented students who reported cheating. The measure was positively skewed for the cheating group (Sk = 1.57), with more students reporting low levels of cheating than high levels of cheating. For the beliefs about cheating measure, the groups consisted of students who reported that cheating is highly inappropriate (49.6%), and students who occasionally endorsed cheating as being acceptable (50.4%). The sample was divided evenly by forming the two groups by splitting the sample at the fiftieth percentile. The first group consisted of students who felt that cheating is generally inappropriate; this group consisted of students who had a mean score on the cheating beliefs scale in the range of 1.00 to 1.33 (on the five point scale), and this group represented 49.6% of the sample. The other group consisted of students who had mean scores in the range of 1.67 to 5.00, and this group represented 50.4% of the sample; in this group, more students responded at the lower end of the scale (beliefs that cheating is somewhat unacceptable) than at the higher end of the scale (Sk = 1.39). Means, standard deviations, and *t*-statistics for the four categories are presented in Table 1 for all variables. We used the Bonferroni method to correct for possible inflated probability levels since multiple tests were conducted (familywise a = .05).

For cheating behaviors, results indicate that students who report cheating report being more extrinsically oriented and less mastery-oriented than non-cheaters. In addition, they perceive their schools as a whole as being more performance focused than do the non cheaters. Students who cheat also report

greater use of self-handicapping strategies, less use of deep cognitive strategies in science, and they report worrying more about school than students who do not cheat.

Similar patterns emerged for beliefs about cheating for most of the variables. However, students who feel that cheating is more acceptable indicate that they perceive their science classrooms as being less mastery-oriented than students who indicate that cheating is not acceptable. While there was a significant difference between cheaters and non cheaters on the school worry scale, no differences in worrying emerged for cheating beliefs. The group that was more likely to endorse cheating beliefs reported perceiving their science classrooms and their schools as being less mastery oriented than the low cheating belief group.

Relations Between Measures

Correlations between the personal, classroom and school culture variables, self handicapping, deep strategy usage, and cheating variables are presented in Table 2. Personal mastery and extrinsic goals were negatively correlated ($r = -.17$, $p < .01$). Classroom mastery and extrinsic goals were unrelated to each other, as were school mastery and ability goal perceptions. Worrying about school was positively associated with perceptions of a school wide stress on performance ($r = .23$, $p < .01$). The use of self handicapping strategies was positively related to perceptions of a school wide focus on performance ($r = .45$, $p < .01$), and negatively associated with perceptions of a school wide focus on mastery ($r = -.28$, $p < .01$).

We tested for differences between membership in the cheating behavior and cheating belief groups. Results indicated that there were differences between students who reported engaging in cheating behaviors, and those who reported believing in the acceptability of cheating behaviors (χ^2 (1) = 38.67, $p<.001$). Of the students who indicated that it is not acceptable to cheat, 21.3% indicated that although they did not believe that cheating was acceptable, they reported having cheated in the past. Of the students who reported that cheating is sometimes acceptable, 42.7% reported that they had not cheated.

We tested for differences in cheating behaviors and beliefs across various demographic factors. There were no statistically significant differences on demographic variables in the sample between those who reported having cheated and those who did not, by gender (χ^2 (1) = 0.09), ethnicity (χ^2 (1) = 0.01), parental education[2] (χ^2 (1) =9.36), and grade level (χ^2 (2) =1.79). For beliefs about cheating, minority students indicated that they believed that cheating is somewhat acceptable more than did non-minority students (χ^2 (1) =4.58, $p<.05$). No significant differences in beliefs about cheating were found for gender (χ^2 (2) =1.03) or for grade level (χ^2 (4) = 3.38), or for parental education (χ^2 (1) = 0.24).

Predictors of Cheating

We used logistic regression as the major analytic technique. Logistic regression is particularly useful in situations where the dependent variable in a regression analysis is dichotomous (Kleinbaum, 1994).

We tested demographic variables (gender, parental education, and grade level) as predictors; since none were significant, they were dropped from the final models. We then entered personal goal orientation (mastery, extrinsic), perceptions of the science classroom goal stress (mastery, extrinsic), perceptions of school goal stress (mastery, performance), school worry, self-handicapping, and self-reported deep cognitive strategy usage into the model. The final models only included the significant predictors, since logistic regression models tend to need about 50 cases for every predictor variable used in the final model -- consequently, non-significant predictors were eliminated from the final models (Wright, 1996).

Table 3 contains the logistic regression coefficients, standard errors, and the odds ratio for the final models. The odds ratio represents the change in the odds of membership in the target category (cheating/high beliefs in the acceptability of cheating), given a one-unit increase in the predictor variable (Wright, 1996, p. 223). It is generally easier to interpret the odds ratio than the b coefficient in a logistic regression. For example, the odds of engaging in cheating behaviors are 1.57 times greater for a student whose self-handicapping measure was 3.0, as opposed to 2.0 (a full unit lower), after accounting for the other variables in the model; the odds of engaging in cheating behaviors are

2.36 times lower for a student whose deep-strategy usage measure was 4.0, as opposed to 3.0 (a full unit lower), after accounting for the other variables.

As an example of how to interpret the logistic regression coefficients, for a student who had scores of 3.0 on all of the significant predictors of cheating behaviors, the estimated probability of engaging in cheating in science is 0.71 (71%). This is calculated by multiplying the value for each measure by the appropriate b coefficient from Table 3. These terms then are added to the constant. The sum of these values (in this case 0.90) is then used to estimate the probability of being in the target group (i.e., cheaters) by using the sum as "g" in the following formula (Wright, 1996):

$$e^{g} / (1 + e^{g}).$$

In general, results indicate that students who report cheating tend to worry about school, to perceive their school as being performance-focused, to perceive their science classrooms as being extrinsically oriented, to engage in self-handicapping behaviors, and to not report using deep strategies often in science. The model was successfully able to classify 73.14% of the cases (χ^2 (5) = 62.32, $p<.001$, deviance of log likelihood (-2LL) = 317.61).

For the model examining predictors of beliefs about cheating, significant predictors include personal extrinsic goals, perceiving the science classroom as being extrinsically oriented, reported use of self-handicapping strategies, and reported use of deep cognitive strategies (the greater the reported use of strategies, the lower the likelihood of believing that cheating is acceptable).

Although wor
ying about school was a predictor of cheating behaviors, it was unrelated to c
heating beliefs. The model was successfully able to classify 70.67% of the
cases (χ^2 (6) = 71.26, $p<.001$, deviance of log likelihood (-2LL) = 321.06).

Discussion

Cheati
g is a common occurrence in American schools. As early adolescents
ove from elementary school environments, which often are highly mastery orien
ed, to middle school environments, which often are highly performance
riented (Midgley et al., 1995), students may begin to see cheating as a means t
survival in the more competitive middle school context.

Cheating in S
cience

Result
of the present study indicate cheating behaviors and beliefs in science are a
sociated with a number of seemingly maladaptive motivational orientations.
Perceiving that the classroom stresses extrinsic goals is related to higher report
of cheating, and to believing that cheating behaviors are acceptable.
variety of studies and research point to the negative effects of extrinsic ince
tives on intrinsic motivation, learning, and achievement (e.g., Kohn, 1986;
epper, Greene, & Nisbett, 1973; Lepper, Keavney, & Drake, 1996; Ryan & Deci,
1996). In the present study, the personal extrinsic scale was operationaliz
d in terms of doing one's science work in order to get some type of extrinsic ince
tive (e.g., grades, getting the right answer, avoiding getting into

trouble). This measure was related positively to believing that cheating is somewhat acceptable, although it was unrelated to self-reported cheating behaviors.

The classroom extrinsic scale was operationalized in terms of being able to get out of certain academic tasks as a "reward" for good academic performance. This represents a very specific type of extrinsic reward structure, similar to Nicholls' conception of work avoidance (Nicholls et al., 1990). In the present study, early adolescents who perceive that they can get some type of reward (e.g., getting out of homework) for doing well, report greater engagement in cheating behaviors, and report believing that cheating is acceptable. It is ironic that for many students, the "reward" for doing well and learning is to be able to get out of additional learning activities. Indeed, if the incentive value of the reward (e.g., getting out of doing homework) is more important to the adolescent than the academic task itself, then the student may see cheating as an acceptable behavior.

Perceiving the school as stressing performance (ability) goals also was related to higher self-reports of cheating in science; however, it was only a marginally significant predictor of beliefs about cheating ($p<.10$). When schools stress performance goals, instructional policies and practices tend to emphasize grades, and demonstrating one's ability relative to others (see Anderman & Maehr, 1994, for a review). When school environments during adolescence stress goals that emphasize ability and performance (e.g., doing better than others or proving one's ability), students often seek the easiest way to attain that

goal (Maehr & Midgley, 1996; Midgley et al., 1995). Indeed, why should a student be concerned about the inherent value of learning, if, for example, the reward of getting on the Honor Roll is purely based on the grade that the student earns? If students perceive that success in their school is defined in terms of grades and ability, then students may feel more justified in engaging in cheating behaviors. Data from the present study support this notion -- when students perceived that their schools emphasized performance goals, students were more likely to report engaging in cheating behaviors. Thus for some students, it appears that cheating is a viable alternative, particularly when the student does in fact perceive the school as focusing on relative ability and performance.

Deep cognitive strategies and cheating. Research indicates that individuals are more likely to report using deep cognitive strategies (e.g., connecting new work with previously learned material, trying new ways to solve complex problems) when they perceive a mastery goal stress in the environment (Ames & Archer, 1988; Nolen, 1988; Nolen & Haladyna, 1990; Pintrich & De Groot, 1990). In the present study, personal, classroom, and school-wide perceptions of mastery goals were unrelated to cheating behaviors and beliefs in most cases. Nevertheless, the reported use of deep cognitive strategies, which often is associated with mastery goals, was related to lower reports of cheating and less likelihood of endorsing cheating as acceptable.

Why would the use of deep cognitive strategies be related to lesser engagement in and endorsement of cheating? The use of complex cognitive strategies is deliberate, rather than automatic (Paris, Wasik, & Turner, 1991).

Students must put forth some effort in order to use appropriate cognitive strategies. For students to use strategies successfully, they must be aware o what strategies to use, they must attribute their successes to the use of these strategies, and they must feel a sense of control over academic outcomes (Borkowski, Weyhing, & Carr, 1988; Paris et al., 1991). Consequently, studer ts need to plan their use of such strategies. One explanation for negative relati on between the reported use of these strategies and cheating behaviors in the present study is that just as it takes deliberate effort to use these strategies, it also takes deliberate effort to cheat. Thus the student who decides to expen the effort to use complex learning strategies, and who truly values those strategies, may feel that it is self-defeating to cheat. Indeed, if a student is willing to exert the effort to use complex strategies, then cheating may undermine the perceived effectiveness of the strategies.

Self handicapping and cheating. Results of the present study also indicate a relationship between cheating and self-handicapping. Specifically, students who report engaging in self-handicapping behaviors also are likely to report that they cheat, and are likely to endorse cheating as acceptable. Cheating is qualitatively different than academic self-handicapping. When a student uses self-handicapping strategies, the student engages in behaviors t iat allow the student to ascribe subsequent poor performance to a variety of external factors. Self-handicapping strategies include behaviors such as blami ng others for one's failure, making excuses for not doing well on school work, and putting off work until the last minute (Midgley & Urdan, 1995; Midgley et al.,

1996). Both self-handicapping and cheating behaviors are strategies that students can use to appear competent to others. However, when a student cheats, the student is not making excuses for poor performance, but rather, the student is crossing a moral line, and engaging in a behavior that may guarantee a good grade on an assignment or an exam. While it is possible that self-handicapping behaviors eventually lead to cheating, longitudinal studies examining this hypothesis still need to be done.

Self-handicapping may be related to cheating since both are strategies that allow students to appear competent to others. Students want to appear competent in school to their peers and their teachers (Covington, 1992; Garcia et al., 1995). The use of self-handicapping strategies may help students to maintain this appearance of competence (Midgley et al., 1996). By cheating, a student also can appear to do well on a test or an assignment, and thus maintain the appearance of doing well. However, while the use of self-handicapping strategies may help students to maintain a positive sense of self-worth (cf., Covington, 1992), cheating probably does little to maintain a student's self-worth, since the student is fully aware of cheating.

Worrying about school and cheating. Results of the present study indicate that students who worry about school also are more likely to report engaging in cheating behaviors. However, worrying about school was unrelated to beliefs about cheating. Thus students who report worrying about school are somewhat more likely to report that they cheat in science, while they do not necessarily believe that cheating is either acceptable or unacceptable.

Snow, Corno, and Jackson (1996) suggest that academic worrying is related to a variety of negative behavioral outcomes, including distraction, reduction of attention, reduction in confidence, and interference with cognitive processing. However, students' beliefs about the appropriateness of cheating may be a reflection of a moral belief system that has developed over time. Thus worrying about doing well in school may be a catalyst in terms of engaging in cheating behaviors, but worrying in and of itself may not be enough to change belief systems concerning cheating.

One important issue for future research is to ascertain the sources of worries about school, and the reasons why such worries may lead to cheating. While some research suggests that worrying about tests and exams may be related to cheating (e.g., Rost & Wild, 1990), research on cheating during adolescence is too nascent to draw definitive conclusions. Results of the present study indicate a positive relation between worrying about school and perceiving the school as being ability focused. The increasing stress on ability and performance associated with middle level schools may produce general feelings of anxiety and specific worries about test performance in some students (Eccles & Midgley, 1989). These fears may lead some students to embrace cheating as a tactic for academic survival.

Characteristics of Students and Cheating

Interestingly, demographic factors were found to be unrelated to cheating behaviors and beliefs in this sample of adolescents. While prior studies using college-age populations have indicated that males are more likely to cheat than

females (e.g., Baird, 1980), results of the present study suggest that during early adolescence, gender is unrelated to cheating in science. In addition, other demographic factors, including ethnicity, parental education, and grade level, also were unrelated to self-reports of cheating and to beliefs about the acceptability of cheating, after controlling for other variables. Newstead et al. (1996) suggest that gender differences in motivation and moral reasoning might explain these findings in college student populations. However, results of the present study indicate that during early adolescence, classroom and school factors are much more important in determining the likelihood of cheating than is gender. Cheating also was found to be unrelated to grade level and parental education. Few studies to date have included these variables with early adolescent populations. Results of the present research suggest that these variables do not contribute to cheating behaviors or beliefs during early adolescence. However, it is important to note that we asked about cheating behaviors and beliefs specifically for science classes. It is possible that in other domains, and with different definitions of cheating, more demographic differences may have emerged. In addition, the items that we used to assess cheating behaviors focused on specific types of behaviors (e.g., using cheat sheets, copying on tests, getting answers from others). These items did not assess other types of cheating, such as giving answers to other students. In addition, the beliefs about cheating scale focused specifically on beliefs about the acceptability of cheating. It is possible that measures of different types of

cheating behaviors and beliefs than those used in the present study might be related to demographic variables.

Emphasizing a Mastery or a Performance Oriented Learning Environment

One of the inevitable questions that arises from research of this nature regards the implications of changing the learning environment. While a variety of studies suggest that learning environments that stress mastery and improvement are conducive to higher levels of motivation and learning (e.g., Ames, 1990, Maehr & Midgley, 1996), it should be noted that none of the mastery oriented variables (personal, classroom, or school) emerged as significant predictors of cheating behaviors, and that perceptions of the school as being mastery oriented only emerged as a marginally significant negative predictor of beliefs about cheating ($p < .10$). This is not to say that perceptions of a mastery oriented environment are unimportant, rather, results of the present study particularly point to the detrimental effects of perceiving learning environments as focusing on ability, performance, and extrinsic factors. Perceptions of such environments appear to be conducive to cheating. In the present study, an increased perception of a classroom or school emphasis on mastery does not significantly change the likelihood of a student engaging in cheating behaviors, and perceiving the school as being mastery oriented only marginally decreases the likelihood of believing that cheating is unacceptable. Additionally, students may perceive classrooms and schools as being mastery or performance oriented for a variety of different reasons. Some students may hold such perceptions due to

teacher characteristics, others may hold such perceptions due to attitudes of their peers, and others may hold these perceptions due to parental pressures.

It is possible that the relation between mastery goals and mastery goal perceptions and cheating is more complex than the direct relationship examined in the present study. Pintrich and Garcia (1991) suggest that a mastery goal orientation (their term is "intrinsic") will not lead directly to increased levels of performance. Rather, when students endorse mastery goals, they will be more likely to be more cognitively engaged, and to use deeper cognitive processing strategies, which ultimately may lead to improved performance. Other research (e.g., Anderman & Johnston, in press) also supports the hypothesis that mastery goals indirectly lead to increased levels of performance, since students who adopt mastery goals tend to use more appropriate strategies, and to perceive themselves as being more competent than students who are not mastery oriented. Future studies using longitudinal designs and path analytic techniques may yield additional information concerning the possible links between mastery goals and cheating.

Results of the present study suggest that it is the perception of a focus on performance and extrinsic goals that is specifically related to higher levels of cheating and beliefs in the acceptability of cheating. Research suggests that middle school environments can be changed, so that the stress of the school as a whole, as well as the stress within individual classrooms, can be moved away from a stress on ability and extrinsic incentives. Maehr, Midgley, and their colleagues (Maehr & Midgley, 1991; Maehr, Midgley, & Urdan, 1992; Maehr &

Midgley, 1996) have demonstrated that under the guidance of strong administrative leadership, middle schools can change the environments of classrooms and schools to focus on mastery and improvement, while at the same time decreasing the focus on ability and extrinsic incentives. Since environments in which early adolescents learn appear to be somewhat malleable, changes in these goal stresses may lead to lower levels of cheating. If the environment is one which does not stress competition and winning at all costs, then students may have less of an incentive to cheat.

Methodological Issues

As noted by others (e.g., Newstead et al., 1996), it is extremely difficult to operationalize cheating. In particular, it is difficult if not impossible to determine if students are telling the truth about their cheating behaviors. It is also very difficult to conduct observational studies of cheating, since the very nature of cheating precludes direct observation. The percentage of students reporting that they have cheated is 39% in the present study. This is similar to findings of other studies. For example, Hetherington and Feldman (1964) found that 46 out of 78 college student subjects cheated during at least one exam in a study of academic cheating. Newstead et al. (1996, p. 232) reported different percentages for different types of cheating behaviors. For example, they found that while 36% of their subjects admitted to copying another student's course work without the student's knowledge, only 1% of the sample reported taking an exam for another student, or having another student take an exam for them (Newstead et al., 1996; see also Hartshorne & May, 1928).

Given the finding in the present study that a number of students report never cheating, we believe that our choice of logistic regression was an appropriate analytic technique. Traditional linear ordinary least squares regression would have been inappropriate, given the skewness of the dependent variable. Future studies using larger samples and multiple classrooms and schools may benefit from analyses using multilevel regression techniques such as hierarchical linear modeling (Bryk & Raudenbush, 1992).

In addition, the present study was limited to the domain of science. Since some research indicates that cheating occurs more in some subject domains than in others (e.g., Bowers, 1964), future studies in multiple subject domains are warranted. However, we feel that the choice of science for the present study was a wise choice, since previous research indicates that cheating may be more prevalent in science than in other domains (Newstead et al., 1996; Schab, 1991). In addition, longitudinal studies of changes in cheating behavior over time are needed. Due to limited resources, we were only able to include students from one school in this study, which raises some concerns about the generalizability of the findings. Although the sample included students from diverse backgrounds, future studies using larger samples from more sites and from different age groups are needed.

Finally, studies involving experimental designs may provide additional useful information regarding student cheating. Some studies of cheating using experimental methods have been conducted. For example, Houston (1977) conducted a study in which college students were put into conditions in which

expectations regarding the ability to cheat were either high, medium, or low. Comparisons of actual test scores indicated that students who expected to be able to cheat had significantly higher test scores than students who believed that they would not be able to cheat, even after actual cheating was prevented. Nevertheless, the ethical issues implicit in experimental studies of cheating make it particularly difficult to conduct such studies, particularly with adolescent populations.

While there is little direct evidence linking other developmental changes to cheating behaviors during adolescence, there are other important developmental issues that may contribute to cheating behaviors. During early adolescence, students begin to explore and fully develop their identities (Erikson, 1968), and they begin to think about moral issues in a more complex manner (Gilligan, 1982; Kohlberg, 1984; Piaget, 1932). If the middle school environment is more focused on ability, grades and performance than the elementary school (Midgley et al., 1995), and if a stress on grades and performance is associated with higher incidences of cheating (Newstead et al., 1996), then the middle school environment may provide a particularly powerful context for the study of cheating behaviors. Some adolescents, faced with the interplay among the environmental, social, physical, and psychological changes associated with adolescence, may see cheating as a viable and necessary strategy for academic success.

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Table 1

Means, Standard Deviations, and F Statistics

Variable	Cheating Enhancers			Beliefs in the Acceptability of Cheating		
	Non-Cheaters	Cheaters	F (df)	Low	High	F (df)
Personal Evidence	2.75 (1.68)	3.16 (0.84)	3.98* (1,91)	2.62 (0.97)	3.23 (0.85)	5.58* (1,91)
Personal Mastery	3.64 (0.64)	3.52 (0.84)	1.33 (1,92)	3.45 (0.79)	3.81 (0.55)	4.44* (1,91)
Classroom Evidence	2.49 (1.38)	2.63 (1.48)	2.49(1 (1,92)	2.14 (1.31)	2.78 (1.58)	3.41 (1,91)
Classroom Mastery	4.05 (0.82)	4.09 (0.74)	1.71 (1,90)	4.36 (0.62)	4.04 (0.85)	4.04* (1,90)
School Environment	2.04 (0.88)	2.53 (0.96)	4.96* (1,89)	1.99 (0.76)	2.81 (0.96)	8.16* (1,91)
School Mastery	4.37 (0.63)	4.13 (0.71)	7.52* (1,91)	4.24 (0.55)	4.09 (0.76)	5.91* (1,90)
School Worry	3.68 (0.98)	3.45 (0.92)	3.92* (1,92)	3.68 (0.99)	3.55 (0.91)	9.91* (1,91)
Self-Handicapping	4.67 (0.89)	2.26 (1.99)	5.54* (1,92)	3.57 (0.70)	2.71 (1.91)	6.45* (1,91)
Deep Strategy Use	3.75 (0.71)	3.80 (0.76)	1.14* (1,92)	3.93 (0.71)	3.67 (0.75)	3.75* (1,91)

Note: The Bonferroni adjustment method of adjustment was used to control for familywise Type I error. * Result significant at $p < .05$ if the observed $p < .0056$.

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Table 4

Intercorrelations

Variable	1	2	3	4	5	6	7	8	9	10	11
1 Grade-Point Average	—										
2 Grade Goals	.27**	—									
3 Personal Standards	.23**	.37**	—								
4 Personal Mastery	.18**	.27**	.47**	—							
5 Classroom Extrinsic	.12*	.06	.12*	.28**	—						
6 Classroom Mastery	.14**	.27**	.21*	.41**	.51	—					
7 School Performance	.21**	.28**	.36**	.26	.18*	.24**	—				
8 School Mastery	.13*	.28**	.15	.41**	.12*	.28**	.43	—			
9 School Wins	.18*	.15	.07**	.16	.11	.21	.23**	.18*	—		
10 Self-Handicapping	.21**	.34**	.44**	.12**	.18*	.28**	.40**	.22**	.18*	—	
11 Task Strategy Use	.18**	.22**	.14	.43**	.22**	.28**	.16	.40**	.27**	.16	—

*p<.05 **p<.01

Note. Cheating is coded 1 = does not cheat, 2 = cheats; beliefs about cheating is coded 1 = believes that cheating is inappropriate, 2 = believes that cheating is appropriate at times.

Table 3

Logistic Regressions Predicting Student Engagement in and Beliefs Toward Cheating

	Cheating Behaviors			Beliefs in the Acceptability of Cheating		
Variable	b	SE	Odds Ratio (e^b)	b	SE	Odds Ratio (e^b)
Personal Extrinsic				.43**	.16	1.54
Classroom Extrinsic	.26*	.11	1.30	.22*	.11	1.25
School Performance	.49**	.18	1.63	.31†	.18	1.36
School Mastery				.43†	.23	1.54
School Worry	.46**	.16	1.58			
Self Handicapping	.45**	.17	1.57	.49**	.19	1.63
Deep Strategy Use	.86***	.21	2.36	.68***	.21	1.97
Constant	1.50	.80		0.85	1.14	

*** p< .001 ** p< .01 * p< .05 † p< .10

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Appendix I. Scales and Reliabilities

Scale	Item	Reliability
Cheating	I cheat on my science work.	$\alpha = .76$
	I use cheat sheets when I take science tests.	
	I copy answers from other students on science tests.	
	When I don't understand my science work, I get the answers from my friends.	
	I copy answers from other students when I do my science work.	
Beliefs About the Acceptability of Cheating	How serious do you think it is if somebody cheats on science work?	$\alpha = .64$
	If you were sure you wouldn't get caught, would you cheat on your science work?	
	Is it OK to cheat on science work?	
Personal Mastery Orientation	I like science work that I'll learn from, even if I make a lot of mistakes.	$\alpha = .72$
	The main reason I do my work in science is because I like to learn.	
	I feel most successful in science when I learn something I didn't know before.	
	I like science the best when it really makes me think.	
	Understanding the work in science is more important to me than the grade I get.	
Personal Extrinsic Orientation	The main reason I do my work in science is because we get grades.	$\alpha = .63$
	The main reason I do my science work is because I would get into trouble if I didn't.	
	I don't care whether I understand something or not in science as long as I get the right answer.	
	I do my science work because it's required, not because I want to.	
	I only figure out why I got a problem wrong when the teacher makes me do it.	
Self Handicapping	Some students lied around the night before a test, so that if they don't do well, they can say that is the reason.	$\alpha = .86$
	Some students let their friends keep them from paying attention in class or from doing their homework. Then if they don't do well, they can say their friend kept them from working.	
	Some students look for reasons to keep them from studying (not feeling well, having to help their parents, taking care of a brother or sister, etc.). Then if they don't do well on their school work they can say that is the reason.	
	Some students purposely get involved in lots of activities. Then if they don't do well on their school work, they can say it is because they are involved with other things.	
	Some students put off doing their school work until the last moment so if they don't do well on their work, they can say that is the reason.	

Science Deep Strategies	When working on a science problem, I try to see how it connects with something in everyday life When I make mistakes in science, I try to figure out why I try to connect new work in science to what I've learned before I take my time to figure out my work in science If I can't solve a science problem one way, I try to use a different way. I spend some time thinking about how to do my science before I start it. I ask myself questions when I work on science to make sure I understand	$\alpha = .78$
School Performance Focus	In this school, teachers are always talking about the honor roll and the honor society In this school, we are encouraged to compete against each other for grades. In this school, only a few kids get praised for their school work This school has given up on some of its students In this school, teachers treat kids who get good grades better than other kids In this school, teachers only care about the smart kids	$\alpha = .72$
School Mastery Focus	Teachers in this school want students to really understand their work, not just memorize it In this school, we are given a chance to do interesting and creative work Trying hard counts a lot in this school In this school, teachers believe all students can learn In this school, every student can be successful	$\alpha = .72$
School Worry	I worry about getting good grades in school I worry about whether my teachers think I'm as smart as other kids in my classes. I worry about doing worse than other students in school	$\alpha = .63$
Teacher Classroom Mastery	Our teacher gives us time to really explore and understand new ideas Our teacher really wants us to enjoy learning new things. Our teacher recognizes us for trying hard	$\alpha = .63$
Teacher Classroom Extrinsic	If we do really well, we can get out of doing some assignments or work as a reward If we do well, we can get out of doing homework	$\alpha = .77$

Endnotes

1. For the Beliefs About Cheating scale, the following anchors were used for the response options. For the item, "How serious do you think it is if somebody cheats on science work," the anchors were 1 = very serious, ... 5 = not serious at all. for the item, "If you were sure you wouldn't get caught, would you cheat on your science work," the anchors were 1 = definitely not, ... 5 = definitely yes. for the item, "Is it OK to cheat on science work," the anchors were 1 = Never, ... 3 = Sometimes, 5 = All the Time

2. Parental Education was divided into two categories, "lo" and "hi," based on the mean level of education for each parent. The "lo" category represented the bottom 50%, and the "hi category represented the upper 50%